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| 09/800,515 | 03/08/2001 | Yasuhiro Yagi | 010251 | 5071 |
| 23850 | 7590 | 09/03/2004 | EXAMINER | |
| ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP 1725 K STREET, NW SUITE 1000 WASHINGTON, DC 20006 | | | BARBEE, MANUEL L | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2857 | |

DATE MAILED: 09/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|------------------------------------|--|
| Office Action Summary | Application No. 09/800,515 | Applicant(s) YAGI ET AL. | |
| | Examiner Manuel L. Barbee | Art Unit 2857 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 1-27 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15 is/are allowed.
- 6) ☒ Claim(s) 1-14 and 16-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 12 is objected to because of the following informalities: In claim 12, line 3 of the claim, after "time", insert --is not reflected in the subsequent reference output characteristic while, in the case that the--. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1- 4 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takehara et al. (US Patent No. 5,669,987) in view of Takeda (US Patent No. 5,594,313) and Asaoka (Japanese Patent Publication No. 2000022192 to Mitsubishi, English Translation).

With regard to measuring an output characteristic of a photovoltaic power system and comparing the measurement with a reference characteristic and diagnosing the normality/abnormality of the photovoltaic power system, as shown in claims 1, Takehara et al. teach measuring an output characteristic of at least two solar cells and comparing the measurements to diagnose whether a solar cell is abnormal (col. 2, line 24 - col. 3, line 19). With regard to the reference characteristic being obtained in accordance with an installation condition and configuration of the photovoltaic power system, as shown in claims 1, Takehara et al. teach taking into account a certain installation condition

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including position of the strings or arrays (col. 6, lines 14-21). With regard to diagnosing the power system normal only if the output is greater than a first predetermined value and lower than a second predetermined value, as shown in claim 1, Takehara et al. teach diagnosing abnormal solar cells for relatively low and relatively high outputs (col. 2, line 55 - col. 3, line 4).

Takehara et al. do not teach that the installation condition includes topography of the installation site and meteorological conditions, as shown in claim 1. Takehara et al. do not teach that the installation condition is installation site, direction or angle or configuration, as shown in claim 2. Takeda teaches taking into account the surrounding area and grounds, buildings and elevation, which are all topographical conditions (col. 1, lines 45-49). Takeda teaches taking into account weather and temperature, which are meteorological conditions (col. 1, lines 24-41). Takeda teach taking into account the seasons and latitude or direction (col. 1, lines 16-30). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the abnormality detection method, as taught by Takehara et al., to include calculating the capacity in many installation conditions as taught by Takeda, because then the solar cell would have been used in many installation sites (Takeda, col. 2, lines 36-41).

Takehara et al. do not teach comparing with a reference or past measurement result of the photovoltaic power system itself or performing the comparison at different time points of a day, as shown in claim 1. Asaoka teaches comparing the present measurement of a solar battery with a past reference measurement of the same solar battery at intervals of one hour (page 9, par. 19). It would have been obvious to one of

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ordinary skill in the art at the time the invention was made to modify the abnormality detection method, as taught by Takehara et al., to include comparing with a reference of the solar battery or cell itself at one hour intervals, as taught by Asaoka, because then there would have been differences in measurements would not have been caused by differences in batteries.

Takehara et al. do not teach diagnosing the cause of abnormality based on the comparison result, as shown in claim 3. Asaoka teaches determining whether snow is covering the light receiving surface (Abstract). It would have been obvious to one of ordinary skill in the art at time the invention was made to modify the abnormality detection method, as taught by Takehara et al., to include determining whether snow is covering the light receiving surface, as taught by Asaoka, because then a cause of failure could have been identified and corrected.

With regard to the reference output characteristic and the output characteristic including voltage or current, as shown in claim 4, Takehara et al. teach measuring and comparing voltage and current (col. 4, line 53 - col. 5, line 4).

With regard to the reference output characteristic varying in accordance with actually measured output characteristic, as shown in claim 26, Takehara et al. teach measuring reference characteristics under the same conditions (col. 2, line 24 - col. 3, line 19).

4. Claims 5, 7-10, 13, 14, 16, 17, 19, 20, 22, 23, 25 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takehara et al. in view of Asaoka (Japanese Patent Publication No. 2000022192 to Mitsubishi, English Translation).

With regard to storing a measurement result of an output characteristic of a photovoltaic power system and diagnosing the abnormality/normality of the photovoltaic power system based on the measurement itself or performing the comparison at different time points of a day, as shown in claims 5, 9, 10, 16, 17, 19, 20, 22 and 25, Takehara et al. teach determining a variation ratio of electrical parameters of a solar cell and using this measurement to determine abnormality by comparing to a reference variation ratio (col. 2, line 55 - col. 3, line 19; col. 8, lines 11-53; Fig. 12). Output is loaded into a computer and recorded on a disk (col. 7, line 61 - col. 8, line 10). With regard to an installation condition as shown in claims 5, 19 and 25, Takehara et al. teach taking into account installation conditions (col. 6, lines 14-22). With regard to diagnosing the power system normal only if the output is greater than a first predetermined value and lower than a second predetermined value, as shown in claim 25, Takehara et al. teach diagnosing abnormal solar cells for relatively low and relatively high outputs (col. 2, line 55 - col. 3, line 4).

Takehara et al. do not teach comparing with a reference or past measurement result of the photovoltaic power system itself, as shown in claims 5, 9, 10, 16 and 19. Asaoka teaches comparing the present measurement of a solar battery with a past reference measurement of the same solar battery at intervals of one hour (page 9, par. 19). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the abnormality detection method, as taught by Takehara et al., to include comparing with a reference of the solar battery or cell itself at intervals

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of one hour, as taught by Asaoka, because then there would have been differences in measurements would not have been caused by differences in batteries.

With regard to using a past measurement, as shown in claims 9 and 22, comparing the past measurement with a current measurement to determine abnormality, as shown in claims 5, 10, 16, 19 and 25, Takehara et al. teach comparison with a slope known from research (col. 8, lines 11-45).

With regard to the output characteristic including direct current voltage, alternating current voltage, direct current electric energy or alternating current electric energy, as shown in claims 8 and 14, Takehara et al. teach measuring voltage, power or current (col. 3, line 53 - col. 5, line 4).

Takehara et al. teach all the limitations of claim 5 upon which claim 7 depends, of claim 10 upon which claim 13 depends and claim 22 upon which claim 23 depends. Takehara et al. do not teach diagnosing the cause, as shown in claims 7, 13 and 23. Asaoka teaches determining whether snow is covering the light receiving surface (Abstract). It would have been obvious to one of ordinary skill in the art at time the invention was made to modify the abnormality detection method, as taught by Takehara et al., to include determining whether snow is covering the light receiving surface, as taught by Asaoka, because then a cause of failure could have been identified and corrected.

With regard to the reference output characteristic varying in accordance with actually measured output characteristic, as shown in claim 27, Takehara et al. teach

measuring reference characteristics under the same conditions (col. 2, line 24 - col. 3, line 19).

5. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takehara et al. in view of Asaoka as applied to claim 10 above, and further in view of Eryurek et al. (US Patent No. 6,119,047).

Takehara et al. and Asaoka teach all the limitations of claim 10 upon which claim 12 depends. Takehara et al. and Asaoka does not teach excluding the measurement from subsequent reference output characteristic when the measurement is abnormal and including the measurement when it is normal, as shown in claim 12. Eryurek et al. teach generating trained values or learning nominal values during normal operation (col. 4, line 66 - col. 5, line 31). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the snow coverage detector, as taught by Asaoka, to include training during normal operation, as taught by Euryek et al., because then the reference value would not have been skewed by an abnormal measurement.

6. Claims 6, 11, 18, 21 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takehara et al. in view of Asaoka as applied to claims 5, 10, 16, 19 and 22 above, and further in view of Takeda.

Takehara et al. and Asaoka teach all the limitations of claim 5 upon which claim 6 depends and claim 10 upon which claim 11 depends. Takehara et al. and Asaoka do not teach that the installation condition is installation site, direction or angle or configuration, as shown in claim 6, or that the reference output is obtained differently for

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each period of time among the plurality of periods of time gained by dividing a year.

Takeda teaches taking into account weather and temperature, which are meteorological conditions (col. 1, lines 24-41). Takeda teach taking into account the seasons and latitude or direction (col. 1, lines 16-30). Seasons divide the year. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the abnormality detection combination, as taught by Takehara et al. and Asaoka, to include calculating the capacity in many installation conditions as taught by Takeda, because then the solar cell would have been used in many installation sites (Takeda, col. 2, lines 36-41).

Takehara et al. and Asaoka teach all the limitations of claim 16 upon which claim 18 depends, of claim 19 upon which claim 21 depends and claim 22 upon which claim 24 depends. Takehara et al. and Asaoka do not teach measuring solar radiation, as shown in claims 18, 21 and 24. Takeda teaches measuring solar radiation (col. 1, lines 17-21). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the abnormality detection combination, as taught by Takehara et al. and Asaoka, to include calculating the capacity in many installation conditions as taught by Takeda, because then the solar cell would have been used in many installation sites (Takeda, col. 2, lines 36-41).

Response to Arguments

7. Applicant's arguments filed 18 May 2004 have been fully considered but they are not persuasive. Applicant's newly added limitation to the claims that the comparisons are "performed at different times of a day" does not read over the cited art. Asaoka

teaches testing for snow accumulation, which includes a comparison, at intervals of one hour (page 9, par. 19).

Allowable Subject Matter

8. Claim 15 is allowed.

9. The following is a statement of reasons for the indication of allowable subject matter: Takehara et al. do not teach a method for diagnosing a photovoltaic power system that comprises obtaining a reference output characteristic for a first photovoltaic power system based on a measurement result of output characteristic of a second photovoltaic power system where the two photovoltaic power systems are installed at different sites, measuring an output characteristic of the first photovoltaic power system, comparing the reference output characteristic with the measured output characteristic and diagnosing the first photovoltaic power system based on the comparison.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Manuel L. Barbee whose telephone number is 571-272-2212. The examiner can normally be reached on Monday-Friday from 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on 571-272-2216. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-0976.

mlb
August 4, 2004


MARC S. HOFF
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